Life Cycle Management

Selective Multinationality

How Environmental Management Helps High-Tech SMES Identify High-Growth, Low-Risk Markets

David Hunkeler

Correspondence address: David Hunkeler, General Director, AQUA+TECH Specialties S.A., Chemin du chalet du bac 4, CH-1283 La Plaine CP 28, Geneva, Switzerland (david.hunkeler@AQUAplusTECH.ch; URL http://www.aquaplustech.ch)

DOI: http://dx.doi.org/10.1065/lca2002.12.103

Abstract

Background. Small and medium sized enterprises in developed regions, as well as larger 'Southern' firms are more exposed to risk in regards to allocation decisions. This includes expenditures on fixed assets, R&D and environmental management, as well as the choice of suitable markets for the product or service at hand. For either type of firm, the consequences of not selecting, or timing, suitable markets can lead to bankruptcy.

Objectives. This paper examines means for SMEs to expand internationally given the current fiscal climate, and rapid advances in certain enabling technologies. The goal is to identify a set of criteria which smaller firms can use to globalize which reduce risk and increase access to capital.

Methods. Case studies are presented of a European Start-Up as well as a century-old Latin American firm, both in the water-treatment sector. The similarities in the risk-reward profiles are used to identify some key strategic guidelines for enterprises wishing to be, selectively, multinational.

Results and Discussion. Selective multinationality is an immediate plan for international expansion which identifies the most appropriate markets, independent of their proximity to the firm's production base or headquarters. At the base of selective multinationality, is the goal to impose the firm's product in regions of high growth, high selling price and low risk of price dumping. Therefore, this requires the *to resist the temptation to expand to markets based on merely geographical proximity.*
The globalization strategy should be established, along with environmental management, from the outset of the creation of the firm. It will be shown, herein, to be a key driver in the valuation of High Tech industrial SMEs, in particular those with high risk-high reward tradeoffs. Selective multinationality can best be implemented if the firm in question has a technology which addresses unmet needs in niche markets, where there is an expanding customer base focusing on client relationships and cost effectiveness, and where the multinationals enter from outside the sector via resellers. It will be demonstrated to be effective for startups from developed regions, as well as SMEs from developing/emerging countries, to both of whom the consequences of sub-optimal resource allocation can risk the future of the firm itself. Therefore, SMEs can, with appropriate planning and the integration of marketing and environmental strategies, become, selectively, global firms, with better credit access and sales growth, concomitant with lower risks. The High Tech industrial SME will succeed better if, from the outset, they behave like the organization they want to become, with globalization a key element of strategy, from the business plan foreword. Two case studies are presented, one documenting the water sector and the other the cost savings possible by integrating environmental management into the firm's strategy.

Keywords: Environmental management; entrepreneurship; expansion; globalization; ISO 9000; ISO 14000; manufacturing

1 Introduction

1.1 General challenges faced by industrial, high-tech SMEs

Manufacturing-based small and medium sized enterprises (SMEs), and in particular entrepreneurial projects in the high technology sector, can be characterized by the following attributes [1]:

- Rapidly evolving technology
- Long periods of negative cash flow
- Competition from multinationals outside the sector, attracted by the high margins and growth
- Lack of familiarity with regulatory restrictions which slow the installation of capacity
- High uncertainties in regard to market development and competition

The ensemble of these constraints often appear during a period when the management team is incomplete. This is particularly true for startups where sub-optimal resource allocation decisions can risk the future of the firm itself. Indeed, this *'high risk-high reward'* tradeoff is observed in organizations of different sizes who have restricted, or conditional, capital. Two specific industrial examples, not typically compared, are the 5–50 person High Tech Startups in developed countries, and the 100–500 person manufacturing-based SMEs in developing/emerging countries (in 'the South'). Both of these types of companies need to keep up with rapidly changing norms under a condition of tight cash flow constraints. If one adds to this the common environmental risk evaluation which large financial institutes impose on small industrial firms, then the potential penalty, often an additional 2% in debt carrying charges per annum can be a significant burden, given the high ratio of debt to equity in SMEs.

Therefore, one hypothesis of the present article is that *small firms in developed countries have similar risk-reward profiles as medium sized enterprizes in 'developing' regions.* For example, the 100 year old, 100-person Argentinean coagulant producer, Meranol [2], has a similar risk-reward spectrum as the 5 year old, 13-person Swiss Startup, AQUA+TECH [3]. Both are producers of chemicals, coagulants and flocculants respectively, for water treatment. Both must certify to ISO 9000 and 14000 standards [4,5], which would otherwise be trade-barriers, negotiate their joint ventures with strategic partners and install, or modify, capacity in such a way as to permit sales growth under the credit terms which are severely limited due to national or global crises, and a general tendency to fund projects in other 'emerging' sectors such as Biotech or information technology. These are the high risk-high reward firms to which selective multinationality is targeted.

Given the capital limitations of the high risk-high reward organization, their cost of having to re-design or re-install a facility could lead to the destabilization, or collapse, of the firm. Therefore, the need for careful planning, which will not have to be significantly corrected, is a driver with particular relevance to industrial high-tech SMEs. If anything, *environmental management, and the potential risks associated without it, become more important as the size of the firm decreases.* We will attempt to show herein that globalization, meaning to expand on market criteria rather than on geographical proximity (i.e. selective multinationality), offers High Tech industrial firms, with rapid product development capabilities, an opportunity to grow at lower risk. Furthermore, a comprehensive environmental management policy is complimentary with the cash needs inherent in globalization. Reference [6] describes a double-normalized indicator that can benchmark projects both in terms of financial indicators and environmental burdens. Technology, globalization and environment, perhaps only the first of which has commonly been associated with SMEs, will be the prerequisites for the SMEs in the high tech industrial sector with triple-digit growth. Specifically, the presented hypothesis is that High Tech industrial SMEs can offer value generation typically associated with new-economy type ventures (e.g. Internet, Drug Discovery) provided they have a strategy for globalization, and environmental management, from the outset, and have top management commitment to them.

1.2 Specific characteristics of high tech firms

High Technology, can, for an industrial corporation, of any size, be characterized by the following factors:

- A much higher than average expenditure, as a percentage of shareholder value or revenue, on R&D. This can vary from slightly over 3% in the materials or process sectors, to close to 30% for biotechnology
- The penetration of rapidly expanding markets based on the offering of novel goods or services which reduce the user cost for a given unit of 'utility'
- A high price-to-earnings ratio for firms with products in the market at the early stage of the product life cycle
- A valuation multiple of two or more times yearly sales
- The ability, under the present conservative global investment context, to attract seed- or venture-capital for non-consulting services (for startups)
- A focus on an intellectual property portfolio
- The presence of scientists[1] and engineers in the direction of the firm
- In-house or out-sourced capacity to continue to innovate after the first product is launched (for startups)
- Scarce, highly paid, and highly volatile, human resources

A SWOT associated with these factors reveals that the high risk-high reward firms have products which can dominate a market, if introduced rapidly. This opportunity is set off against the risk of insufficient capital and the lack of knowledge of national, continental or international norms, which can change rapidly, as well as, in many industries, the cost of certification. Therefore, in this article, we will show that the weakness and threats for a typical one-product high tech firm, can be partially offset by appropriately identifying a globalization strategy. Specifically, *by being selectively multinational, and entering countries where the selling price is high, sales growth is rapid and price dumping is a low risk, access to capital will increase, reducing other treats.* This is the heart of selective multinationality, which mandates a firm not to expand based only on geographical considerations. It will be demonstrated with some case studies.

[1] The presence of world-renown scientists and engineers as advisors or board members, is an unusual occurrence, though correlates well with the sustainability of the startup

2 Synergies between International Business and Environmental Management for High Tech SMEs

Globalization for the high risk-high reward firms has increased the need for awareness. Examples include international standards which often must be absorbed in a timely manner, due to supply chain pressure [7]. The ISO 9000 and 14000 norms [4,5] can, specifically, be viewed by SMEs and firms in emerging markets as trade barriers. The increased speed of business decisions, the lack of an ability to sustain long periods of negative cash flow, and a vulnerable credit relationship, render manufacturing-based SMEs sensitive to their resource allocation decisions. Indeed, even the short-term survival of the organization requires an ability, in a rapidly changing business context, to make the correct decision, *the first time.* The sensitivity of SMEs, and the new global business climate prompt the present proposal for the means by which smaller northern firms and larger southern enterprises can globalize, minimizing their total business risk in the process. As an example, certification to ISO 9000 and 14000, the respective quality and environmental standards, open global markets to the high risk-high reward startups and SMEs discussed herein. Interestingly, the cost is lower, and the implementation more rapid, if the environmental norm is established prior to the quality standard [8] indicating a second advantage for the incorporation of environmental standards into globalization and expansion strategies. *Therefore a targeted environmental management program can be seen as a prerequisite for business activities on the international market and for securing investment capital, especially for small firms.* One of the consequences of rapidly penetrating high-margin growing markets (i.e. selective multinationality) may be the need to certify to international quality and environmental norms.

3 Selective Multinationality

3.1 What is selective multinationality?

Selective multinationality is an *immediate plan for international expansion* that is *not focused on geographical proximity*, but on worldwide market niches. It should be part of the annual planning document, and business plan for entrepreneurial projects. Selective multinationality is based on the concept that the global market is better diversified and offers more possibilities, with less risk of being attacked or absorbed by larger firms, and less vulnerable to market changes. The international market also offers better access to capital, of the appropriate size, to assure a critical growth, which is sufficient to be attractive while not exposing the SME to excess debt that it cannot carry. Furthermore, growth is necessary to reach the economies of scale and to pay back the enormous R&D investments. Therefore, selective multinationality is geared at High Tech industrial firms with a product which can dominate a new or growing market segment. It involves:

- Resisting the temptation to expand strictly based on geographic proximity
- Entering markets where the SME's product or technology can dominate, e.g., by the flexibility of the firm to serve various customer demands
- Seeking the geographical regions where the selling price is high
- Seeking the geographical regions where the sales growth is high
- Avoiding markets where there are government subsidies of national firms, or a high likelihood of price dumping

3.2 Implementation of selective multinationality

Selective multinationality works most effectively if the following criteria are met:

1. The SME in question is created as a "brain" company, with rapid product or process development, prototyping, scaleup and introduction
2. The products offer technological advantages
3. Clients focus on cost effectiveness, thereby permitting the SME to guarantee a total rate for a service, rather than a price for the product
4. The market in question is expanding or rapidly changing
5. The product or service can service an unexploited niche market
6. The industrial sector in question focuses on core competencies

The latter requires some explanation. At a given point, the market for certain specialty or commodities (e.g., chemicals) becomes sufficiently large that multinationals have a large overhead to service smaller clients, or even certain regions. Under such conditions, a *window of opportunity opens for SMEs who essentially compete against resellers*. Selective multinationality, therefore, *requires the SME to invest much more heavily than is typical, even for a startup, in the legal costs associated with joint ventures, an intellectual property (IP) portfolio and in negotiations*. They may find it valuable to associate with an individual or firm who offers services, whose cost is based on growth projections. The High Tech industrial SME sector should not be modest in its targets, and must contract in established business leaders as advisors and board members.

Selective multinationality is a *vision*, whose entry gate into the company is, therefore, the firm's direction. It needs to be communicated on a regular basis to the employees and supported financially. It will require demanding an investment, in terms of time, from the employees involved, to manage the growth, and seek partners with similar risk-return ambitions, as well as synergies, independent of where they are located. In short, globalization opens up many more possibilities, for markets of medium size, which may be too small for multinationals and too large for regional firms. Capturing these markets by complimenting the high tech capacity to innovate, with the willingness to sell internationally, will become the new paradigm for high-growth SMEs over the coming decade.

Case 1: Selective Multinationality in Water Treatment

AQUA+TECH Specialties S.A. produces chemicals for water treatment. Their flocculants pass on savings in the order of 20–25% to clients in sectors including biotechnology, paper manufacturing, metals, mining and sugar production, as well as in municipal water treatment. While the market for these materials grows at 20% per annum in developing regions, it averages 2–5% per year in the G7 [9], a sector which is largely occupied by seven multi-billion dollars firms [10]. Therefore, AQUA+TECH's vision of selective multinationality is to target regions where the selling price remains high (e.g., Israel, Scandinavia), there is significant market growth (e.g., South Africa, China and Benelux), there is an absence of government support of local firms (i.e. not France or Italy) and a significant part of the market is occupied by resellers (e.g. USA). Furthermore, it focuses on the middle 40% of the water treatment plants, those which are sufficiently large to require service and offer margins, though small enough to not be serviced directly by large multinational corporations.

AQUA+TECH has constructed two near-zero-discharge facilities, offering the tenth largest flocculant production capacity in Europe [3,10]. Both facilities are leased and the combination of out-sourced production, sub-contracted labor and a lack of discharge, reduces the potential environmental liabilities and risk. The firm, therefore, appears attractive to large financial institutions and their intellectual property can be validated by large batches of product, demonstrated in key markets. In other words, environmental management has been a key component in the strategic plan to globalize, establish joint ventures, license patents and build shareholder value.

For AQUA+TECH, selective multinationality has permitted the firm to target key benchmark clients, such as the Haifa municipal waste water treatment plant in Israel, while establishing a large IP portfolio, installing production capacity and retaining control of 90% of the firm, without any external debt. This positions AQUA+TECH well in terms of valuation, even by old economy standards, as well as for a takeover target. Selective multinationality and environmental management have been, from the outset, the building blocks upon which shareholder value has been established, permitting the firm to target strategic markets which it can dominate independent of their proximity to their Swiss-based production facilities.

Case 2: Environmental Management: A Means to Globalization for High Tech SMEs?

In the High Tech sector corporate value is often created by products of quite evolutionary utility including software, devices and therapies. However, the SMEs which either market, produce or outsource the product, must deal with supply chains accustomed to the marketing of products from multinationals who have certified to international environmental standards. This is because the SMEs, once they are involved in marketing, are often forced to comply with the environmental programs of the largest client or supplier in the supply chain. Since certification to ISO 14000 is less expensive, and more rapid, than to the quality-based ISO 9000 [8,11] SMEs find that the door to global marketing, either direct or indirect, is often faster if they proceed via an environmental management philosophy which permits external third parties to gain confidence in the firm and its technology. The tangible benefits to SMEs and startups, in regard to foreword thinking environmental policies, often established concomitant with the creation of the firm, include [6]:

- Reduced operating costs via the supply chain coordination of transport to reduce the fraction of vehicles traveling with light or empty loads
- General reduced operating costs by closing internal material loops and by reducing materials in manufacturing, resulting e.g., in lower raw material and processing costs
- New product introduction by considering unused raw materials as a marketable asset rather than a cost centered waste stream
- Improved relations with authorities, and reduced disposal costs, linked with the installation of near-zero discharge facilities, which are much easier in small scales if planned from the outset
- Favorable image to local and regional politicians which can provide loan guarantees for promising firms without any significant operational or environmental risks
- Improved credit terms with major financial institutions
- Reduced overhead by having in place an environmental management system which permits the SME in question to correspond to clients and suppliers programs

Several of these benefits, which have been documented, may seem like luxuries for only the most highly funded, venture capital supported, firms. It has to be noted that experience shows that top management commitment is the most important driver, for multinationals and SMEs alike, in regards to environmental management [12]. Furthermore, the various cases reveal that firms as small as 10–100 people, in old-economy sectors such as manufacturing, often take the lead and identify the most significant benefits [13]. The accumulation of the items listed also is important for firms in the initial public offering (IPO) stage, as well as when they seek external capital. It seems, indeed, that *startups have a better chance to grow, and survive, if, from the outset, they behave like the organization they want to become.* If access to key advisors is a critical success factor for small firms, as it is generally recognized to be, the sustained presence of directors or board members who are aware, and can develop, environmental policies for startups, and SMEs, will likely become essential over the coming decade. Though the space in this brief review is too limited to document specific cases, market share, profitability and operating margins have all been shown to increase, for firms with sales ranging from $\$10^{4-7}$ pen annum, with the addition of, and buy-in to, environmental management programs [6,12,14].

4 Conclusions

SMEs in the North and larger 'Southern' enterprises have similar risk-reward spectra. Given this, their consequences of sub-optimal resource allocation, in particular in regards to aspects which can exclude them from current, or new, markets, are similar. This paper makes that case that High-Tech SMEs can be multinational, in a selective fashion, and concomitantly find the funds necessary to continue growth. To do so they must focus on a key set of strategic criterion which are based on identifying high-growth, high-margin, low competition markets, irregardless of geographic proximity. This should be complimented with life cycle management to identify environmental win-win solutions, throughout the supply chain, which can pass on bottom-line benefits, both in the development of new products and processes, as well as in the general operations of the firm.

5 Recommendations and Outlook

The benefits of environmental management increase as the size of the firm decreases. If we accept this, then as a community of nations, we must identify means by which SMEs can expand outside our borders in a manner which provides access to growth and capital, at and affordable level of risk. SMEs can help themselves, to a large extent, by carrying out market research, understanding their competitors product, and sticking to a strategy. They must also resist the temptation to expand based on geographic means only. As a community (e.g. EC) we need to find a means to provide access to seed funding, and in particular liquidity through the supply chain, to our SMEs without requiring them to give up such large percentages of their firms as 21st Century venture capitalists demand. In essence, we need to encourage our SMEs to globalize, to increase EC competitiveness, since 70% of our jobs are from such firms. To do so, we must provide, not grants, but fiscal instruments that can work with High-Tech smaller firms. This paper is a call for the financial institutions, public and private alike, to set up committees to properly define such instruments.

References

[1] Royston J, Hunkeler D, Taylor J, Waubaum R (2002): CREATESwitzerland: A Foundation for Entrepreneurship (www.startupcafe.ch)
[2] Wertheim J, (2002): personal communication
[3] AQUA+TECH Specialties SA (2002): http://www.aquaplustech.ch
[4] ISO 9000 (2000): International Standard ISO 9001: Quality Management Systems – Requirements
[5] ISO 14000 International Standard ISO 14001 (1996): Environmental Management Systems – Specification with Guidance for Use
[6] Hunkeler D, Saur K, Stranddorf H, Rebitzer G, Schmidt WP, Finkeinner M, Jensen AA, Christiansen K (2002): Life Cycle Management, SETAC Press (under review)
[7] EcoIntegra SA (2002): http://www.ecointegra.com
[8] 6th Business Summit on Coagulants and Flocculants, Intertech, Chicago, May 22–24, 2002 (http://www.intertech.com)
[9] Goin J (1991): Water Soluble Polymers, CEH Marketing Research Report, 582.0000 D-E, SRI International (1991)
[10] Baracchini P (2001): Guide à la mise en place du management environnemental en entreprise selon ISO 14001. Presses Polytechniques et Universitaires Romandes, Lausanne, Switzerland
[11] Hunkeler D, Biswas G (2000): Return on Environment: An Objective Validation Tool? Int J LCA 5, 358
[12] Huang E, Hunkeler D (1996): An Executive Survey of Fortune 500 Companies as to their Current Practices on Life Cycle Concepts. Total Quality Env Mgt, Winter 1995/96, 36
[13] Hunkeler D, Huang E (1996): LCA in Japan: An Overview of Current Practices and Trends Relative to the USA. Environmental Quality Management, Autumn 1996, 86 (1996)
[14] Schmidheiny S, Zorraquin FJL and the World Business Council for Sustainable Development (1996): Financing Change. MIT Press, Cambridge, USA

Received: November 13th, 2002
Accepted: December 7th, 2002
OnlineFirst: December 9th, 2002

David Hunkeler is the General Director of AQUA+TECH Specialties S.A., a Swiss producer of water treatment chemicals with projects related to environmental management (see also p. 50, 'Entrepreneurship, Innovation, and Life Cycle Management'). He is also on the Board of Directors of CreateSwitzerland, an association for the promotion of entrepreneurship. David obtained a Bachelors in Engineering and Management from McMaster University (Canada) in 1984 and a Ph.D. in Polymers in 1990. Between 1990 and 1996, David was an Assistant Professor of Chemical Engineering, Management of Technology and Materials Science at Vanderbilt University in Nashville, TN. His research includes the case studies on practical streamlining life cycle assessment approaches, environmentally conscious decision support tools, ecometrics/ecoindicators as well as polymer synthesis and biomaterials. David has authored over one hundred refereed papers, edited three book and has organized five conferences. He conducts sponsored research projects with firms in the United States and has research collaborations with Japan and former Eastern European countries. David Hunkeler has developed the Life Cycle Management system, under contract to selected multinationals and is active in the areas of ecometrics, life cycle costing and practical LCA. David Hunkeler belongs to the Editorial Board of 'The International Journal of Life Cycle Assessment (Int J LCA)'.